rendered capable of the greatest possible amount of extension.

On the upper surface of the skull, clamping the lateral occipital region and projecting backwards for fully half its length beyond the latter, is the flat sabre-like squamosal (Fig. 21, Sq), articulated to the hinder end of which, and thus carried completely away from the auditory region, is the quadrate, a stout bone passing obliquely downwards and outwards, and giving attachment by a rounded pulley-like surface to the mandible. On the inner edge of the quadrate, and partly coalesced with it, is a small nodular ossification representing the stylo-hyal (Figs. 21 and 22, St.Hy). The palatines and pterygoids are well developed and bear large recurved teeth; the latter extend backwards to the quadrate, to which they are united by ligaments just above its articular surface. The maxillæ are large strong bones lying parallel with the palatines and the front half of the pterygoids, and forming an outer dentigerous arch. Between the hinder end of the maxilla and the centre of the pterygoid runs a stout bone, the os transversum, found in this distinct form in all Ophidia, as well as in Lacertilia and Crocodilia, and occurring as a rudiment in some birds.

The two rami of the mandible are united at the symphysis by elastic fibrous tissue only, and each consists of six separate ossifications more or less fused together in the adult. These are the articular (Art) coming into relation with the quadrate, the angular (Ang) and supra-angular (S. Ang) applied, one above and one below, to the outer surface of the articular, the dentary (D) bearing the teeth, and the splenial (Spl) and coronary (Cor) appearing only on the inner surface.

The columella or auditory ossicle is extremely small in the common snake (Fig. 23, Col), and consists of a plug of bone fitting into the fenestra ovalis by a rounded disc-like end, the stapes, and of an extremely short rod anchylosed with and projecting backwards from the disc, which is all that represents the stapedial bones of the frog. In many of the larger serpents, both venomous and harmless, the columella is a rod of very considerable length, tipped at its end, in some cases, by an expanded cartilaginous flap, the homologue of the extra-stapedial.

The earlier stages in the development of the snake's skull have been well worked out by Rathke (" Entwickelungsgeschichte der Natter "). Abstracts of his views will be found in Prof. Huxley's Croonian Lecture (Proc. Roy. Soc., 1858), and in the " Elements of Comparative Anatomy " of the same author (p. 237). The earliest stage described by the lecturer corresponds with Rathke's third period, when chondrification is already thoroughly established, and the slender trabeculæ have united behind with the investing mass, and in front with each other (see Fig. 24). The notochord (Ch) reaches only to the middle of the broad investing mass (I.M), a large membranous space, the "posterior basi-cranial fontanelle" of Rathke (p.b.c.f) being between its anterior pointed end and the " anterior basi-cranial fontanelle," or pituitary space. A large occipital ring is already formed by the growing up of the investing mass around and above the neural canal, and articulating with its edges are the sub-triangular auditory capsules, on which the elevations caused by the semicircular canals (a.s.c, p.s.c, h.s.c) are particularly well marked. The trabeculæ diverge strongly in the pituitary region, in front of it run almost parallel, having between them the tissue from which the parasphenoid is afterwards formed, and eventually unite and expand into the large reniform roofs of the nasal sacs (Na). The alisphenoids (Al.s) are already chondrified, but the orbito-sphenoids (O.s) are backward in development, being mere patches of indifferent tissue in front of the exit of the optic nerve (II). The mandibular arch is completely divided into a short quadrate and a long Meckel's cartilage. The hyoid arch is cartilaginous only in its upper part, and its apex is already fused with the stapes.

In the second stage all the bones of the adult have appeared with the exception of the alisphenoid, orbito-sphenoid, columella, stylo-hyal, and otic bones. The basi-occipital arises in the same manner as the urostyle of a frog or osseous fish,* as a bony deposit in the sheath of the notochord, affecting subsequently the surrounding cartilage; the basi-sphenoid makes its appearance as a pair of ossific centres, one on each side of the apices of the trabeculæ, where they join the investing mass. The parietals and frontals are quite normal in their development, arising as symmetrical ossifications in the supero-lateral region of the membranous cranium, and only acquiring their anomalous adult character by downward extension towards the base of the skull at a later period. In this stage a segment has separated from the hyoid arch and attached itself to the inner border of the quadrate: this is the stylo-hyal, the remainder of the arch now constituting the columella.

In the third stage, consisting of snakes at the point of hatching, all the ossifications have appeared, with the exception of the orbito-sphenoid, which is unusually late and uncertain in its development. Besides the three chief otic centres, which are perfectly distinct from the occipital regions, a plate of bone is to be seen in this stage within the lower edge of the squamosal: this answers to the ectosteal plate of the pterotic, so largely developed in osseous fishes. Lastly, the jaws have acquired their adult character by the loosening of the quadrate from the auditory capsule and its retrogression to its adult position, articulating with the hinder end of the backward-turned squamosal.

NOTES

A MOVEMENT which has been for some time on foot for establishing in London a School of Medicine for Women is now so far matured that the school will be opened for the winter term on Oct. 12, in commodious premises, 30, Henrietta Street, Brunswick Square. The full staff of lecturers has not yet been appointed, but among those who have already consented to take part in the instruction are Dr. King Chambers in the practice of Medicine, Mr. Berkeley Hill in Surgery, Mr. A. T. Norton in Anatomy, Dr. Sturges in Materia Medica, Mrs. Garrett Anderson in Midwifery, Mr. Critchett in Ophthalmic Surgery, Dr. Cheadle in Pathology, Mr. Heaton in Chemistry, and Mr. A. W. Bennett in Botany. The following gentlemen have, in addition, consented to serve on the Council:—Dr. Billing, Dr. Buchanan, Mr. Ernest Hart, Prof. Huxley, Dr. Hughlings Jackson, Dr. Murie, Dr. F. Payne, Dr. W. S. Playfair, and Dr. Burdon-Sanderson, as well as Dr. Elizabeth Blackwell. A fair number of students are already enrolled. It is intended to build a detached dissecting-room in the garden attached to the house.

DR. WILLIAM RUTHERFORD has been appointed to the Professorship of Physiology at the University of Edinburgh, vacated by the resignation of Dr. J. Hughes Bennett. Dr. Rutherford, in accepting his new appointment, vacates the Professorship of Physiology at King's College, London, the Assistant-Physicianship at King's College Hospital, and the Fullerian Professorship at the Royal Institution. The duties of the first of these will most probably be undertaken, during the coming session at least, by Dr. David Ferrier.

DR. ADOLF BERNHARD MEYER, the recent explorer of New Guinea, has been appointed director of the Zoological Museum at Dresden, in succession to Dr. Reichenbach, who has retired.

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* In these types a variable number of vertebræ at the termination of the column undergo a process of absorption, and a single ossification appearing in the sheath of the notochord constitutes the urostyle or coccyx. In the head a similar process takes place at the anterior end of the notochord, where a number of vertebræ may be considered to have been suppressed, forming what may be termed a "cephalostyle": the bony deposit spreading from this into the investing mass, gives rise to the basi-occipital.

Dr. Meyer entered upon his new duties on the first of last month.

A CORRESPONDENT with the Transit of Venus Expedition to Honolulu, writing from Valparaiso, informs us of the safe arrival there of the party after a particularly fine passage south; the weather was not so favourable up the Chili coast.

A LARGE and influential meeting of the professional and private friends of the late Dr. Anstie was held on the 23rd ultimo, at the house of Dr. George Johnson, in Savile Row, for the purpose of taking steps to raise a fund to be applied in perpetuation of Dr. Anstie's memory, and in recognition of his public and professional services. Dr. Burdon-Sanderson moved, and Dr. Glover seconded, a resolution—"That, considering the labours of the late Dr. Anstie for the promotion of science, and the circumstances of his untimely death, it is desirable that some permanent memorial of his career should be established." In speaking to this resolution, it was pointed out that Dr. Anstie's widow and three young children were but slenderly provided for, and hence that his only son would probably be unable to obtain the complete education which his father, if his life had been spared, had intended to secure for him. It was felt that the proposed memorial might fittingly take the form of a fund to be devoted to this object, and it was hoped that such an application of money might not be unacceptable to his family, and might be received by them as a fitting tribute to the estimation in which Dr. Anstie was held. By subsequent resolutions, a large committee was appointed to carry out the objects of the meeting, and Mr. J. S. Storr, of 26 King Street, Covent Garden, was appointed treasurer, and Mr. Brudenell Carter and Dr. Wharton Hood were appointed joint honorary secretaries. An executive committee was also nominated; and an opinion was expressed that the circumstances of Dr. Anstie's death, in the discharge of his duty, as well as much of the work which he had done during life to ameliorate the condition of the poor, were sufficient to justify an appeal to the general public as well as to his own profession.

THE Photographic Society invites scientific men who have turned their attention to photography to furnish specimens for their forthcoming exhibition. It is proposed to devote a room to the purely scientific applications of the subject.

WE would again draw the attention of secretaries of British scientific societies to the proposed work referred to in a recent number (NATURE, vol. x. p. 407) by M. Rauïs, of the Belgian Academy—a Dictionary of Learned Societies. He is of course anxious to get full and trustworthy information, and we hope that the numerous societies of this country will lend him every assistance in carrying out his valuable scheme.

THE news of the death of M. Elie de Beaumont, in his 76th year, has thrown a gloom over the French Academy. We believe that his position of perpetual secretary to the Academy will be conferred on M. Bertrand, at present president of the Academy of Sciences. The *fauteuil* of M. Bertrand, who is a member in the section of Geometry, would thus become vacant, and would be the object of a warm contest. Since the foundation of the Academy of Sciences, the place of secretary has been permanent, while that of president has been annual. Among the predecessors of M. de Beaumont were Fontenelle, who died a centenarian after having occupied his *fauteuil* for sixty years, Condorcet, Fourrier, Delambre, and Arago, whom De Beaumont succeeded, the two together having held office for more than half a century. Since the death of Flourens, M. Dumas has been secretary for the Physical Sciences.

AT the Aberdeen Cryptogamic show referred to in last week's NATURE, p. 427, a meeting of botanists was held, when it was agreed to form a Scottish Cryptogamic Society, which, by an annual exhibition held in the larger cities by rotation, and by other means, would endeavour to promote a more general and deeper knowledge of cryptogamic plants. It is intended to hold the exhibition for next year at Perth.

THE first session of the Yorkshire College of Science, Leeds, opens on the 26th inst. There are already four professorships—Mathematics and Experimental Physics (Prof. Rücker), Chemistry (Prof. Thorpe), Geology and Mining (Prof. Green), Textile Fabrics (Prof. Walker).

THE expedition organised in June last by Captain Williams, of Sunderland, in the steamship *Diana*, belonging to Mr. Lamont, of Dundee, has returned to the latter port. The Novaya Zemlya region was the scene of the *Diana's* cruising; the Gulf of Obi was reached, and the conclusion come to that without difficulty a vessel might make Behring Strait. Capt. Wiggins, who was in command, endeavoured to assist the Austrian expedition, but was compelled to give up the attempt. Curiously, however, the *Dinaa* reached Hammerfest just an hour before the members of the Austrian expedition. Some important corrections of the geography of the region around the mouth of the Obi have been made.

THE council of the Institution of Civil Engineers have issued a list of subjects for premiums to be awarded during session 1874-75. Information with regard to the premiums, which are valuable, is prefixed to the list, and we advise those interested to apply to the secretary for information.

THE Council of the Institution of Naval Architects have had under consideration the question of providing a good series of contributions for their next session. They have accordingly prepared a list of subjects, which they desire to submit to the members and associates of the Institution, and others interested in shipbuilding, as questions on which they will be glad to receive communications for the annual general meeting in March (17th to 20th), 1875. Anyone wishing a list of the subjects should apply to the Secretary, 20, John Street, Adelphi.

THERE are several reports to hand of recent earthquakes. There was a violent shock at Randazza, Sicily, on Sept. 27, and several houses were injured. Rumbling noises are audible from Mount Etna.—Intelligence published at New York on Sept. 26 reports that the town of Antigua, in Guatemala, has been destroyed by an earthquake.—Several shocks of earthquake were felt at Delhi on Aug. 31, at 5.25 A.M.—A shock was felt near Sucklaspore, in the Madras Presidency, on the evening of the 17th Aug. The direction of the shock was from east to west, and the duration seven seconds.

A TERRIBLY destructive typhoon swept over Hong Kong about 12 o'clock on the night of Sept. 23. Many vessels were wrecked and the loss of life is estimated at 1,000, and the damage done to property is immense. The typhoon reached Macao, causing there also a fearful amount of damage.

ONE of the Limuli at the Crystal Palace Aquarium died last week from the effects of the continued attacks made on it by lobsters in the same tank. The other Limuli are now in a separate tank.

THE Swiss Society of Public Usefulness, says the *Continental Herald*, which met at Friburg from the 21st to the 23rd inst. inclusive, treated the subjects engaging its attention under two heads, viz., Public Instruction and Industry. Under the first head it discussed whether the professional teaching now given in the Confederacy should be altered; whether in the secondary schools for boys a larger share of scientific education ought not to be given, combined with practical exemplification, manual labour, and experience in industrial chemistry; whether in the secondary and superior schools for girls sufficient attention is paid to the class of studies which will be of service in careers now open to women, and if their education is directed towards facilitating their entry into new occupations; whether it would not be advisable to introduce into secondary schools for girls commercial education and the study of drawing as applied to manufactures, such as those of ribbons, lace, printed stuffs, wall papers, &c.

A NEW horticultural garden has been opened at St. Petersburg under Imperial patronage. It is fifteen acres in extent, and is to be devoted principally to illustrate how native plants may be combined for pretty and tasteful decorations. One large portion is to be devoted to conifers, in order that there may be, even in winter, green promenades.

THE consumption of osiers for various purposes, in England especially, is very great. Besides her own production, this country imports more than 5,000 tons, valued at about 40,000*l.* About 300 varieties of osiers are known, the most important beds being situated near Nottingham; the home produce being insufficient to meet the demands, great attention is being paid to the cultivation beds in Australia, and a considerable quantity is yearly produced in that country.

THE cultivation of the Angora Goat is attracting some attention in Australia, where this animal appears to thrive very well. The hair is said to make a very good "mohair" fabric, but its quality depends very much upon the nature of the locality in which the animals are reared. Undulating prairies with a good supply of pure water are best adapted to the habits of this goat. In sandy hilly districts it thrives admirably, but the hair is inferior and falls off very quickly. The flesh is excellent, and is preferred in some parts of Australia to the best mutton. The milk is of good quality and yields a good supply of butter and cheese. The hair is worth about four shillings a pound, and one ram will yield about four pounds at each shearing; the best plan is to shear them twice a year, as this prevents the hair from falling off and from splitting; at each shearing it is about six inches long. Compared with the merino sheep, the Angora goat seems to have the advantage in the fact that the former produces only three-and-a-half pounds of wool, worth two shillings and sixpence per pound, and that six merinos will eat as much as seven Angoras. These facts are important in view of the acclimatisation of the Angora goat in other parts of the world.

THE New Zealand Flax (*Phormium tenax*) is being cultivated in St. Helena, and there seems no reason why the same thing should not be done in other countries. Hitherto no very great attention has been paid to the cultivation of this plant, but the natural supplies obtained in New Zealand are insufficient for the demands of commerce. It is a mistake to suppose that an illimitable supply can always be obtained because no cultivation has been necessary in the first crops of the wild produce. This is not to be regretted, for careful cultivation cannot fail to greatly improve the fibre, and the best kinds alone will be worth the trouble of proper rearing. Steps are however being taken to cultivate the plant in New Zealand and in other countries which have been fortunate enough to acclimatise it. In the Azores, at St. Helena, in Algiers, and the south of France, it thrives well, and has been easily naturalised. The fibre is principally used for making ropes and paper, for the caulking of vessels, for stuffing mattresses, and for coarse textile fabrics. The seeds yield a valuable oil when crushed.

THE Crystal Palace Company are to give a magnificent fête on behalf of the Hospital Saturday Fund on the 5th inst.

M. HENRY COCKERILL, of Aix-la-Chapelle, nephew of the late John Cockerill, we learn from the *Journal of the Society of Arts*, who founded the great engineering establishment at Seraing, near Liege, which until the immense extension of the Creuzot works was the largest on the Continent, has placed at the disposition of the Société Cockerill the sum of 50,000 francs, to be invested in the public funds of Belgium, the interest to be applied to the endowment of scholarships, to enable the sons of workmen, or others employed by the society, to attend the courses of study at the Mining School of Liege.

THE popular demand in America for a complete series of the annual reports of the United States Geological Survey of the Territories, under the charge of Dr. F. V. Hayden, has been so great that the Secretary of the Interior has ordered the printing of a second edition of the first three annual reports in one volume. A compact 8vo. of 261 pp. with index has in consequence been issued. The survey in its present form commenced in the spring of 1867 with the small grant of $5,000 for the survey of Nebraska, and the following year a similar grant was made for Wyoming. During these two years the survey was under the General Land Office, and the first and second annual reports were included in the reports of the commissioner. Their reprint is a great convenience for reference. In the third year (1869) the survey was placed by Congress under the Secretary of the Interior, and $10,000 was granted for the examination of Colorado and New Mexico. The volume for that year was issued as an independent volume, and was reviewed in NATURE, vol. iv. p. 24. These reports differ from the memoirs of our English survey, which are in illustration of single sheets or sometimes quarter sheets of maps of the survey, for a United States Report includes a whole State. Our own enter into detail; these give general views. Further, these reports give not only the geological and palæontological features and mineral resources of a State, but its agricultural condition and prospects are included. Speaking of the treeless prairies, Dr. Hayden expresses his belief that forests may be restored in a short time, and gives many illustrations of what planters have effected in ten years in Nebraska. Cotton-wood (*Populus monilifera*), Soft Maple (*Acer rubrum*), Elm (*Ulmus americana*), Bass-wood or Linden (*Tilia americana*), Black Walnut (*Juglans nigra*), Honey Locust (*Gleditschia tricanthus*), and Willows, are the trees mostly cultivated. English agriculturists may perhaps be astonished at hearing crops being spoken of as promising because the grasshoppers have left a full half crop of wheat. In the first report are some interesting notes on the present condition of the Otoe Indians; and notes by Dr. Newberry and Prof. Heer, on the fossil leaves of the Dokata group; while the second report includes a sketch of the physical geography of the Missouri Valley. Although called a geological survey, climatal and meteorological observations are interspersed, as well as much information about game and wild animals. There is also much valuable agricultural information, that alone would create a large demand for the reprint.

WE have received the Eighth Annual Report of the Aëronautical Society. The report is mainly occupied with an account of experiments and calculations which have been recently made, and contains a paper by Mr. D. S. Brown on the Aëroplane, and a long and elaborate paper by Mr. James Armour, C.E., entitled "Wings for Man."

THE additions to the Zoological Society's Gardens during the past week include a Praslin Parrakeet (*Coracopsis barklyi*) and four Red-crowned Pigeons (*Erythrœnas pulcherrima*) from the Seychelles, presented by the Hon. Sir Arthur Gordon; two Burchell's Bustards (*Eupodotis kori*) from S. Africa; a Hocheur Monkey (*Cercopithecus nictitans*) from W. Africa; a Punjaub Wild Sheep (*Ovis cycloceros*) from N. W. India; two Blackish Sternotheres (*Sternothœrus subniger*) from the Seychelles; a Common Octopus (*Octopus vulgaris*) from the British Seas, deposited.